

Updated Recommendations for the FERC Small Generator Interconnection Procedures

*RE-DEC Working Group Meeting
San Francisco, CA March 4, 2011*

*Michael Sheehan P.E.
Interstate Renewable Energy Council*



What IREC Does

- The Interstate Renewable Energy Council (IREC) is funded by the U.S. DOE to facilitate renewable energy deployment through adoption of “best practices”
- IREC Participates as an unbiased expert in state utility commission dockets on net metering, interconnection, and community solar program development
- IREC identifies procedures that facilitate distributed renewable energy resource interconnection consistent with reliability and safety
- Active in over 35 states during the past three years

Introduction to FERC SGIP

- 10 kW Inverter Process (level 1)
- Fast Track Process no larger than 2 MW (level 2)
- Study Process no larger than 20 MW (level 3)
- Developed through ANOPR, NOPR, Final Rule
- www.ferc.gov/industries/electric/indus-act/small-gen.asp

Background on FERC SGIP

- SGIP was thoroughly vetted by a broad range of industry participants and codified in FERC Order 2006 in May 2005, and Orders 2006-A and 2006-B in the subsequent year
- See current rule and agreement links at:
www.ferc.gov/industries/electric/indus-act/small-gen.asp

FERC SGIP Screens

- 10 Fast Track screens
- *See* SGIP Sections 2.2.1.1 through 2.2.1.10
- 15 % of peak load on “line section” (2.2.1.2)
- Line Section: That portion of the utility’s Distribution System connected to a Customer bounded by automatic sectionalizing devices or the end of the distribution line.

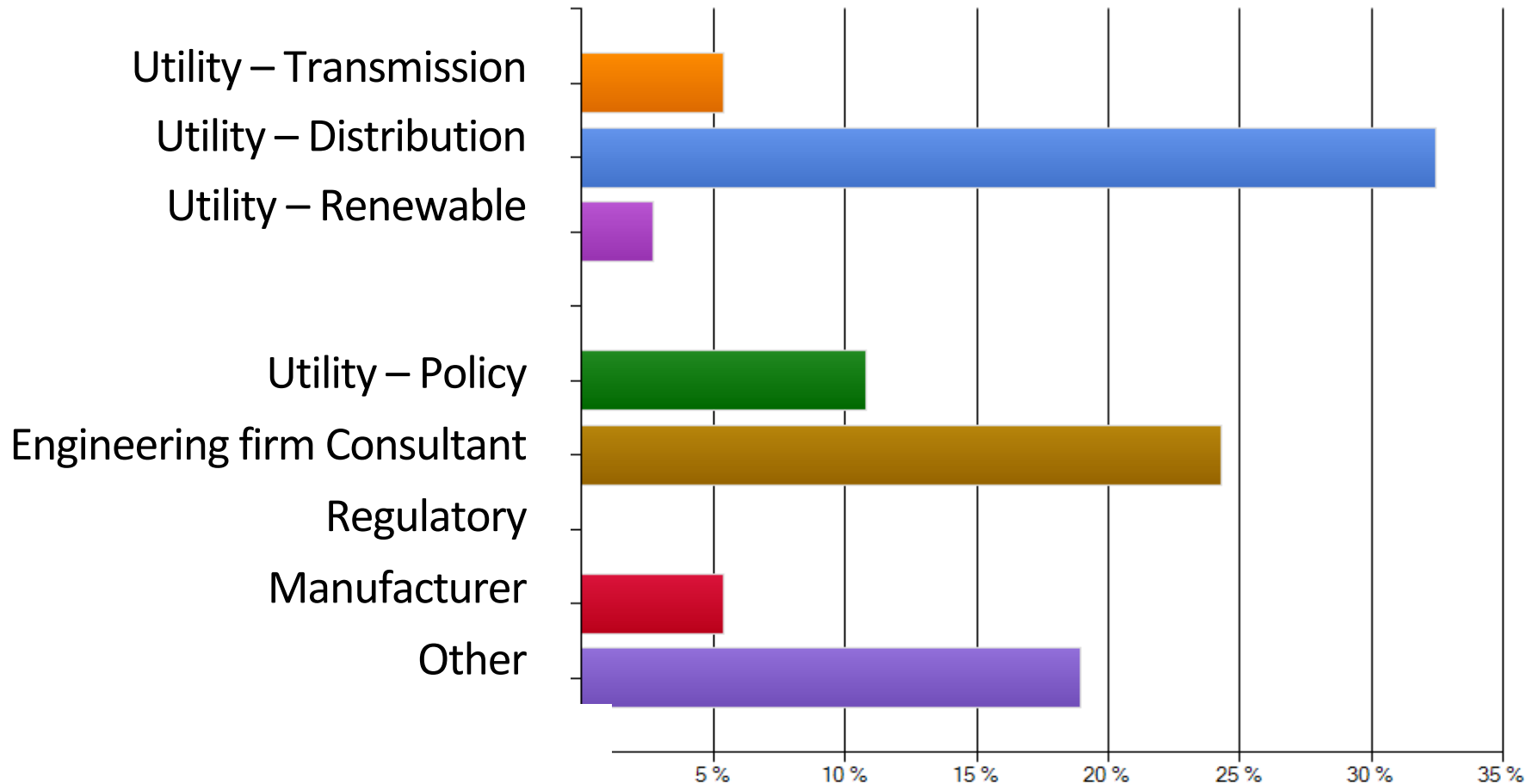
FERC SGIP Subject Matter Experts (SMEs)

- IEEE P1547.6 – Draft Recommended Practice For Interconnecting Distributed Resources With Electric Power Systems Distribution Secondary Networks
- IEEE P1547.7 – Draft Guide to Conducting Distribution Impact Studies for Distributed Resource Interconnection
- DOE designated SMEs

FERC SGIP Results

- Questionnaire request sent to 157 Subject Matter Experts (SMEs)
 - 37 SMEs Completed Questionnaire
 - 12 from IEEE 1547.6 Working Group
 - 32 from IEEE P1547.7 Working Group
 - 5 Solar ABCs/DOE invitees

FERC SGIP Results – Who completed the questionnaire?

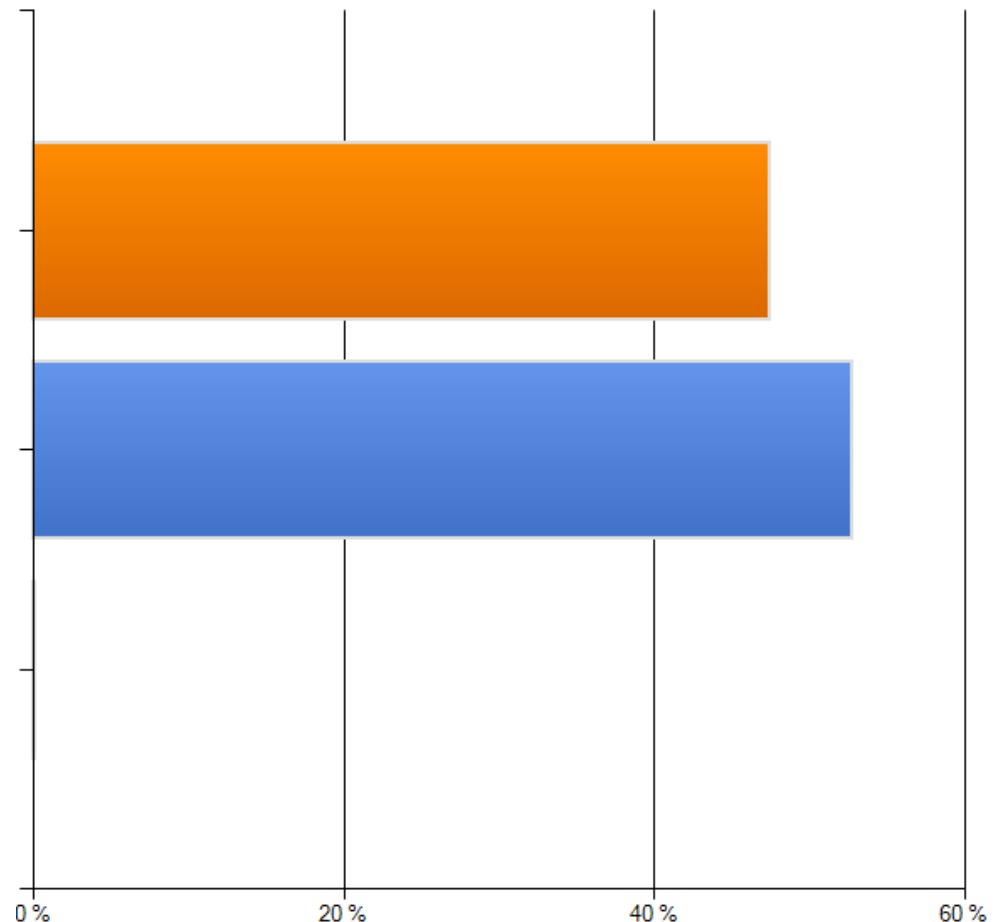


FERC SGIP Results - #2: DG capacity vs. line section peak load (max 15%)

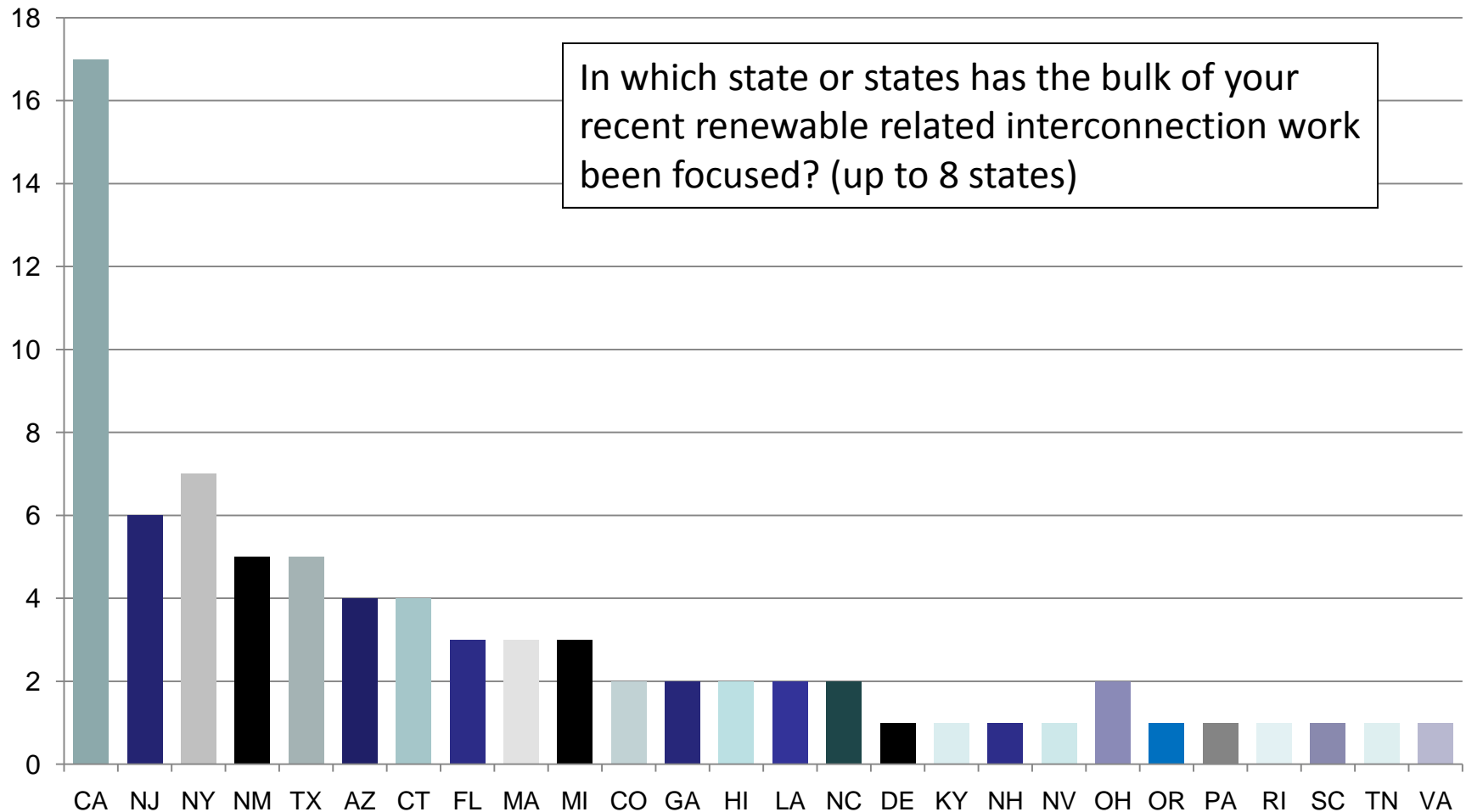
Do you
support
updating
this screen?

YES

NO



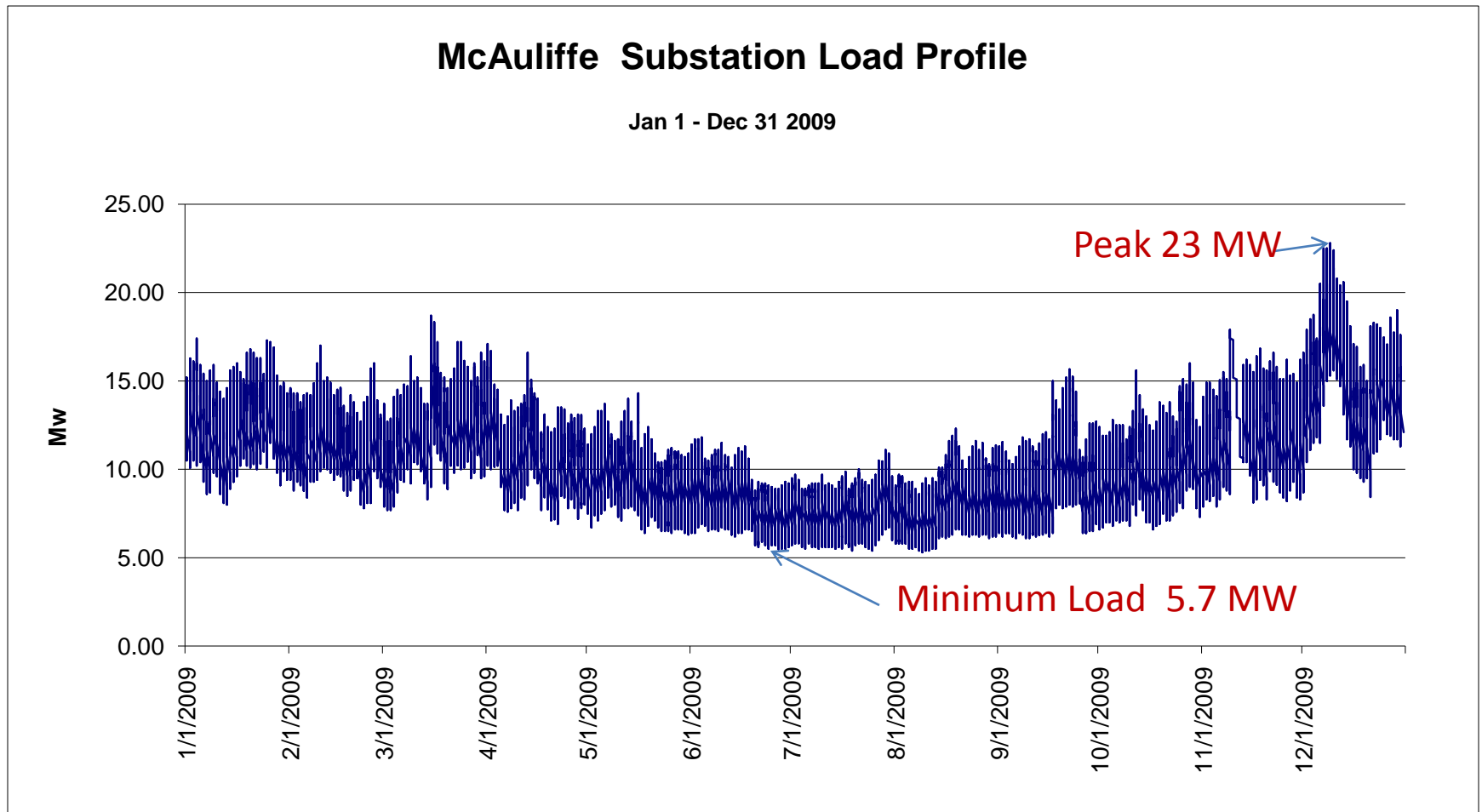
FERC SGIP Results – Who completed the questionnaire?



Proposed Approach from Hawaiian Interconnection Procedures

IREC's proposal to set feeder penetration at 50% of minimum load measured between the hours of 10 a.m. and 3 p.m. is intended to use a more precise measure of minimum load data as penetration reaches higher levels. This proposal simply eliminates the assumption that minimum load is likely to be 30 percent of peak load and instead sets allowable penetration levels that can be accommodated without additional study based on actual data instead of assumptions.

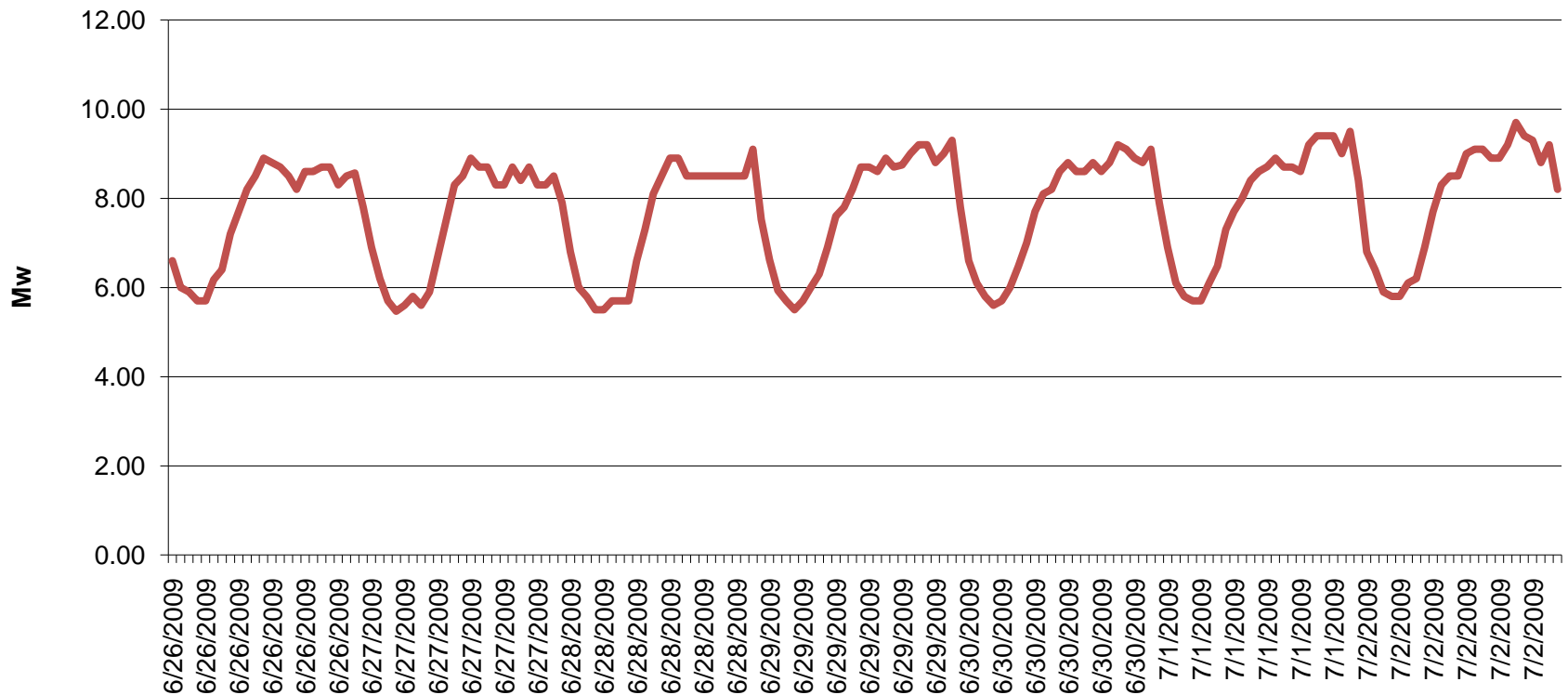
15 % Line Section



Weekly Load Profile

McAuliffe Substation Weekly Load Profile

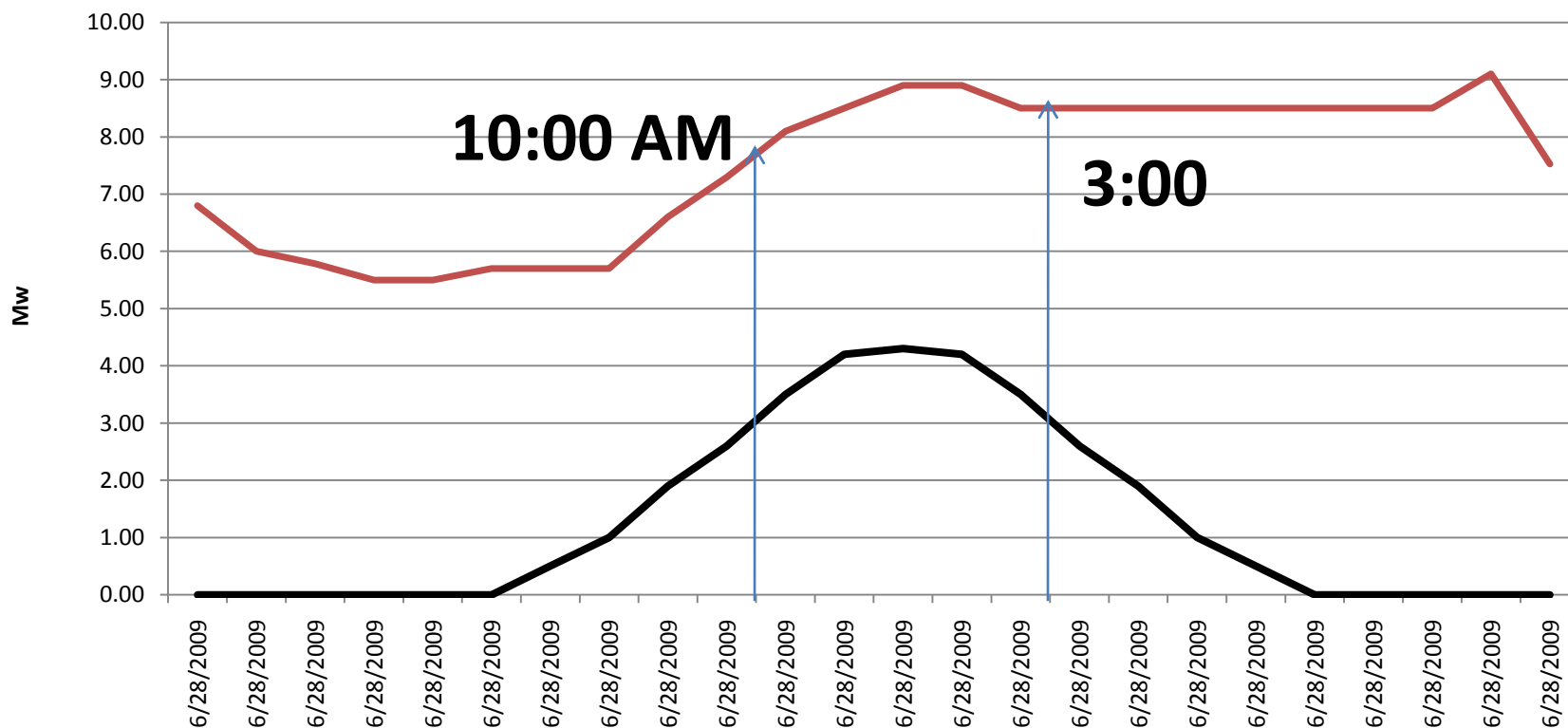
June 26 to July 2, 2009



Daily Load Profile

McAuliffe Substation Daily Load Profile

June 28, 2009



Probability of Islanding

Task V Report IEA-PVPS T5-07: 2002

Balanced conditions occur very rarely for low, medium and high penetration levels of PV-systems. The probability that balanced conditions are present in the power network and that the power network is disconnected at that exact time is virtually zero. Islanding is therefore not a technical barrier for the large-scale deployment of PV system in residential areas

Probability of Island



Asset Management Approach to Quantify Risk

Asset management is not a new practice - utilities have always managed assets.

How utilities manage their assets is undergoing profound change. Asset management approaches and analytical tools have finally matured to the point where decisions can be based on data and facts – not just “gut feel” instincts and intuition.

KEMA

No Free Lunch!

10.3 Recommendations

- It is strongly recommended that PV-inverters be operated at unity power factor.
- It is not advised to use PV-inverters with a variable power factor as this, at high penetration levels, may increase the number of balanced conditions and subsequently increase the probability of islanding.

In Summary

Selected Considerations

- 50% minimum load criteria is consistent with existing FERC-SGIP Screen
- 50% minimum load screen is conservative – FERC has acknowledged that this is the case
- Hawaiian wording for the 50% minimum load approach is one possibility
- Some utilities are already going beyond this level of penetration without any apparent problems
- Future North American study – Quantify the risk by following the approach of Report IEA-PVPS Task V

Feedback

Michael Sheehan, PE

IREC

206.232.2493

climberlow@hotmail.com